

Initial IMO GHG strategy – role of alternative fuels in meeting the ambition?

Symposium on IMO 2020 and alternative fuels
IMO HQ, 18 October 2019

Dr Edmund Hughes
Head, Air Pollution and Energy Efficiency
Marine Environment Division
International Maritime Organization

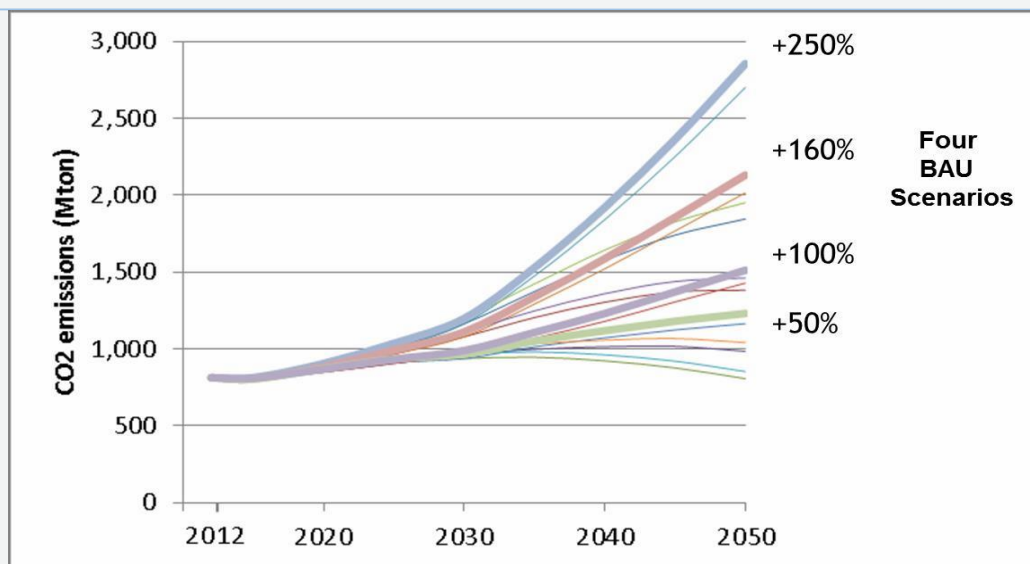
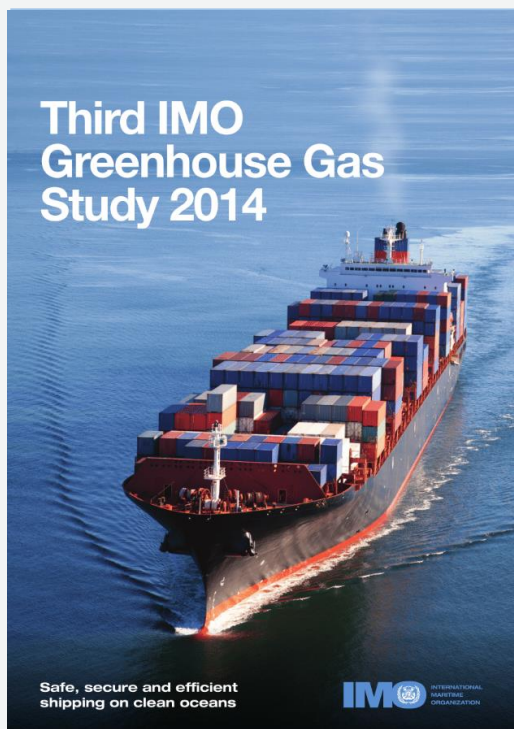


IMO work to address GHG emissions from ships

- In September 1997 Air Pollution Conference adopted resolution 8 on *CO₂ emissions from ships*
- Resolution A.963(23) on *IMO Policies and Practices Related to the Reduction of Greenhouse Gas Emissions from Ships*, adopted by Assembly 23 in December 2003
 - Assembly urged the Marine Environment Protection Committee to identify and develop the mechanism or mechanisms needed to achieve the limitation or reduction of GHG emissions from international shipping and, in doing so, to give priority to:.....
 -the evaluation of technical, operational and market-based solutions
- Resolution A.1110 (30) Strategic Plan, adopted by Assembly in December 2017
 - Strategic Direction 3 *Respond to climate change*



Initial IMO Strategy on Reduction of GHG emissions from ships - context



Ref: Third IMO GHG Study 2014

- In 2012, CO₂ emissions from international shipping were approx. 800 million tonnes accounting for 2.2% of global CO₂ emissions
- ~300MT of fuel oil used by shipping in 2012
- Negligible energy demand for shipping is met by sustainable low/zero carbon energy
- Alternative energy sources and/or alternative fuels are key to reducing GHG emissions
- Demand is the key driver for growth in emissions

ANNEX 11

RESOLUTION MEPC.304(72)
(adopted on 13 April 2018)

INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE

RECALLING Article 38(e) of the Convention on the International Maritime Organization (the Organization) concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

ACKNOWLEDGING that work to address greenhouse gas (GHG) emissions from ships has been undertaken by the Organization continuously since 1997, in particular, through adopting global mandatory technical and operational energy efficiency measures for ships under MARPOL Annex VI,

ACKNOWLEDGING ALSO the decision of the Organization a strategic direction entitled "Respond to Climate Change",

RECALLING the United Nations 2030 Agenda for Sustainable Development,

1. ADOPTS the Initial IMO Strategy on Reduction of GHG Emissions from Ships (hereinafter the Initial Strategy) as set out in the annex to the present resolution;
2. INVITES the Secretary-General of the Organization to make adequate provisions in the Integrated Technical Cooperation Programme (ITCP) to support relevant follow-up actions of the Initial Strategy that may be further decided by the Committee and undertaken by developing States (SDS), particularly least developed countries (LDCs) and small island developing States (SIDS);
3. AGREES to keep the Initial Strategy under review, with a view to adoption of a Revised IMO Strategy on reduction of GHG emissions from ships in 2023.

adopted



NEWS

Home UK World Business Politics Tech Science Health Family & Education

Science & Environment

Global shipping in 'historic' climate deal

The shipping sector is finally on board in the fight against climate change

April 18, 2018 6.46am BST

U.N. shipping agency reaches deal to cut CO2 emissions

Shipping Regulators Reach Deal to Cut Carbon Emissions

Carbon dioxide from ships at sea to be regulated for first time

For The First Time, Maritime Shipping Has A Climate Target

Carbon emissions from global shipping to be halved by 2050, says IMO

Energy and Environment

The shipping industry is finally going to cut its climate change emissions. That's a big deal.

The Washington Post
Democracy Dies in Darkness

Nations Strike Historic Deal to Curb Shipping Emissions

Violeta Bulc ✓
@Bulc_EU

#Shipping sector has delivered! The agreement reached this week at the @IMO HQ is a significant step forward in the global efforts to tackle climate change: international shipping to reduce CO2 emissions by 2050. Important milestone for the #ParisAgreement. bit.ly/2qsMk1j

08:58 - 13 avr. 2018

47 Retweets

Miguel Arias Cañete ✓
@MAC_europa

Significant step forward in the global efforts to tackle climate change: international shipping to reduce CO2 emissions by 2050. Important milestone for the #ParisAgreement. bit.ly/2qsMk1j

08:27 - 13 avr. 2018

Patricia Espinosa C. ✓
@PEspinosaC

The decision to at least halve shipping emissions by 2050 is a major milestone in addressing #climatechange. I call on all nations to build on this achievement and use the review mechanism to step up the level of ambition in 2023 bit.ly/2IXkWCS #MEPC72 #ParisAgreement



07:00 - 14 avr. 2018

ICS shipping
@shippingics

Press Release: ICS Applauds 'Paris Agreement for Shipping' bit.ly/2HyXIZo - @IMO HQ #Shipping #parisagreement #CO2Emission



07:19 - 13 avr. 2018

BIMCO
@BIMCONews

"It is a landmark achievement in the effort to reduce emissions," says Lars Robert Pedersen, BIMCO Deputy Secretary General on adoption of IMO emissions-strategy. #IMO

07:16 - 13 avr. 2018

Initial IMO Strategy on Reduction of GHG emissions from ships

2 VISION

IMO remains committed to reducing GHG emissions from international shipping and, as a matter of urgency, aims to phase them out as soon as possible in this century.

Initial IMO GHG Strategy – levels of ambition

.1 carbon intensity of the ship to decline through implementation of further phases of the energy efficiency design index (EEDI) for new ships

to review with the aim to **strengthen** the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type, as appropriate;

.2 carbon intensity of international shipping to decline

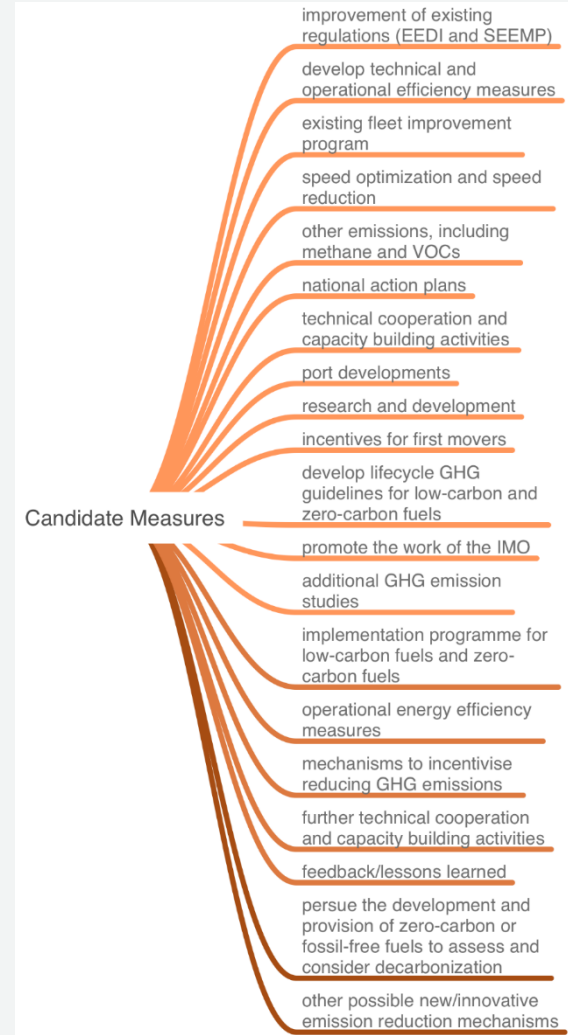
to reduce CO₂ emissions per transport work, as an average across international shipping, by **at least 40% by 2030**, pursuing efforts towards **70% by 2050**, compared to 2008; and

.3 GHG emissions from international shipping to peak and decline

to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by **at least 50% by 2050** compared to 2008 whilst pursuing efforts towards phasing them out as called for in the Vision as a point on a pathway of CO₂ emissions reduction consistent with the Paris Agreement temperature goals.

Candidate measures

- The Initial Strategy identifies a list of candidate measures with the following timelines:
 - Short-term measures could be finalized and agreed between 2018 and 2023
 - Mid-term measures could be finalized and agreed between 2023 and 2030
 - Long-term measures could be finalized and agreed beyond 2030
- The revised IMO strategy is to be adopted in 2023.



Level of ambition 1: carbon intensity of the ship

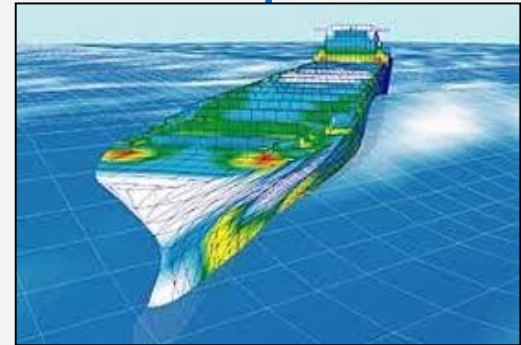
- EEDI adopted 2011, entered into force 1 January 2013
- Phase 0 (2013 to 2015) required EEDI = reference line
- Phase 1 (1/1/2015 to 31/12/2019) required EEDI = reference line - 10%
- Phase 2 (1/1/2020 to 31/12/2024) required EEDI = reference line - 20%
- Phase 3 (from 1/1/2025 onwards) required EEDI = reference line - 30%

- MEPC 71 established a ***Correspondence Group on EEDI Review Beyond Phase 2*** to consider a strengthening of the EEDI phase 3 requirements

- MEPC 74 approved, for adoption at MEPC 75, amendments to regulation 21.2 of Annex VI:
 - **Phase 3 (30% reduction rate) entry into effect is brought forward to 2022** (from 2025), for the following ship types:
 - Gas carrier of 15,000 DWT and above
 - Containership
 - General cargo ship
 - LNG carrier
 - Cruise passenger ship having non conventional propulsion

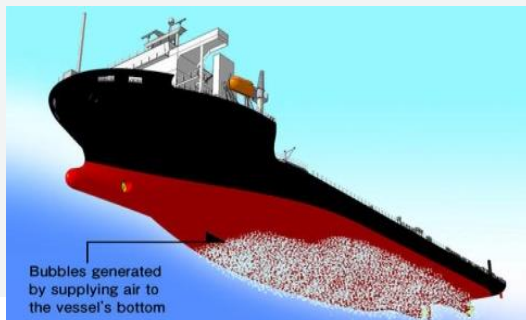
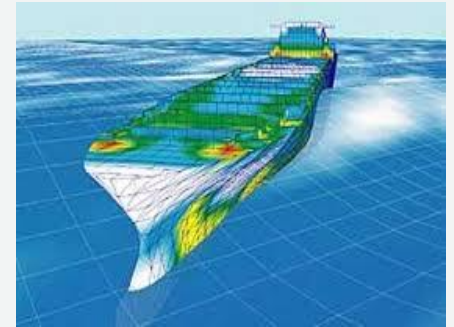
Level of ambition 1: carbon intensity of the ship

- Amendment, if adopted at MEPC 75, would enhance the phase 3 **EEDI reduction rates for containerhips** as follows:
 - 50% for containerhip of 200,000 DWT and above
 - 45% for containerhips > 120,000 DWT and < 200,000 DWT
 - 40% for containerhips > 80,000 DWT and < 120,000 DWT
 - 35% for containerhips > 40,000 DWT and < 80,000 DWT
- MEPC 74 also agreed terms of reference for a Correspondence Group to look into the introduction of a **possible “phase 4” of EEDI requirements**



Level of ambition 2: carbon intensity of international shipping to decline - technical measures for improving energy efficiency

- Improvement of hull form (reduction of propulsion resistance)
- Improvement of engine/propeller (improvement in propulsion efficiency)
- Hull appendage for energy saving
- Waste Heat Recovery
- Utilization of renewable energy, etc.
- Use of LEDs

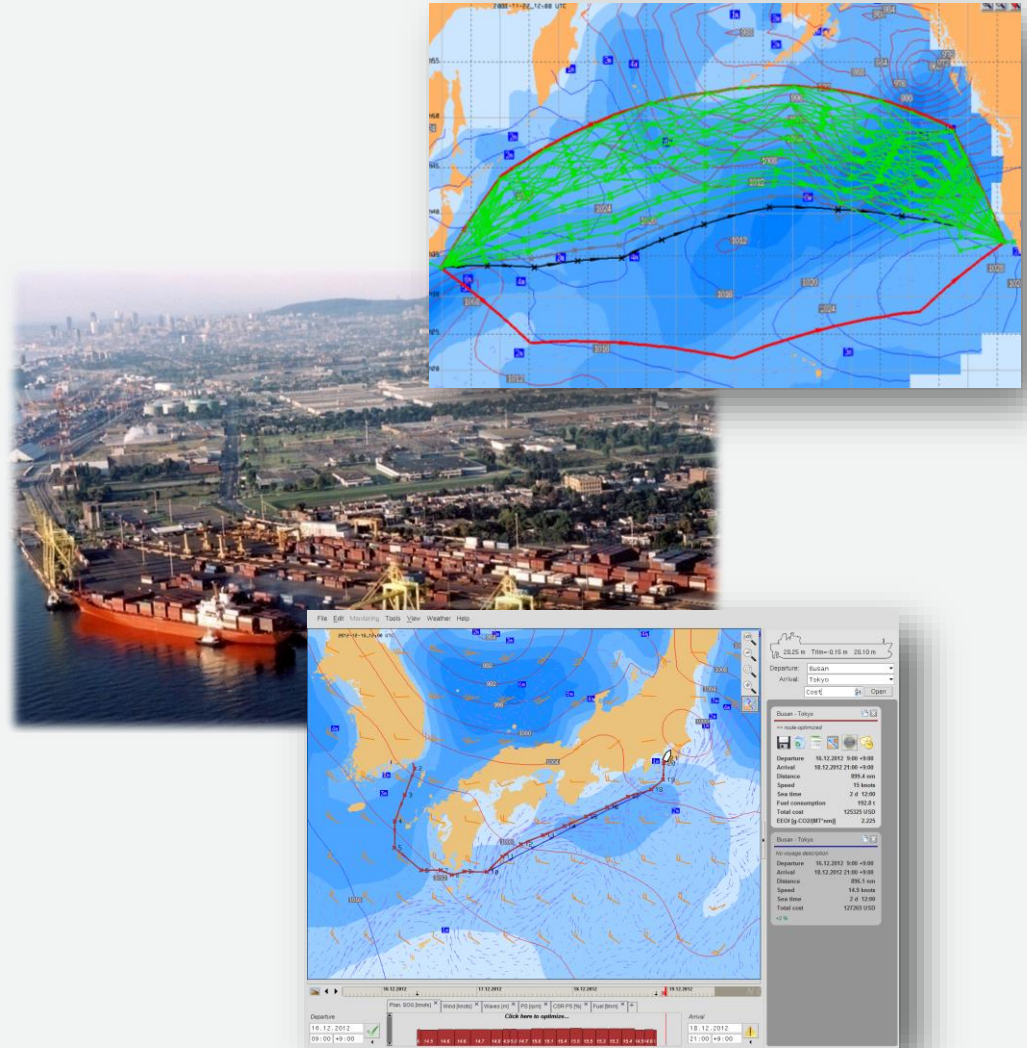


Bubbles generated by supplying air to the vessel's bottom



Carbon intensity of international shipping to decline - operational measures for improving energy efficiency

- Trim & draft optimization
- Optimization of operating plan for each ship or fleet
- Speed optimization
- Weather Routing
- Just in Time arrival in port
- Hull cleaning
- Propeller polishing
- Maintenance of engine

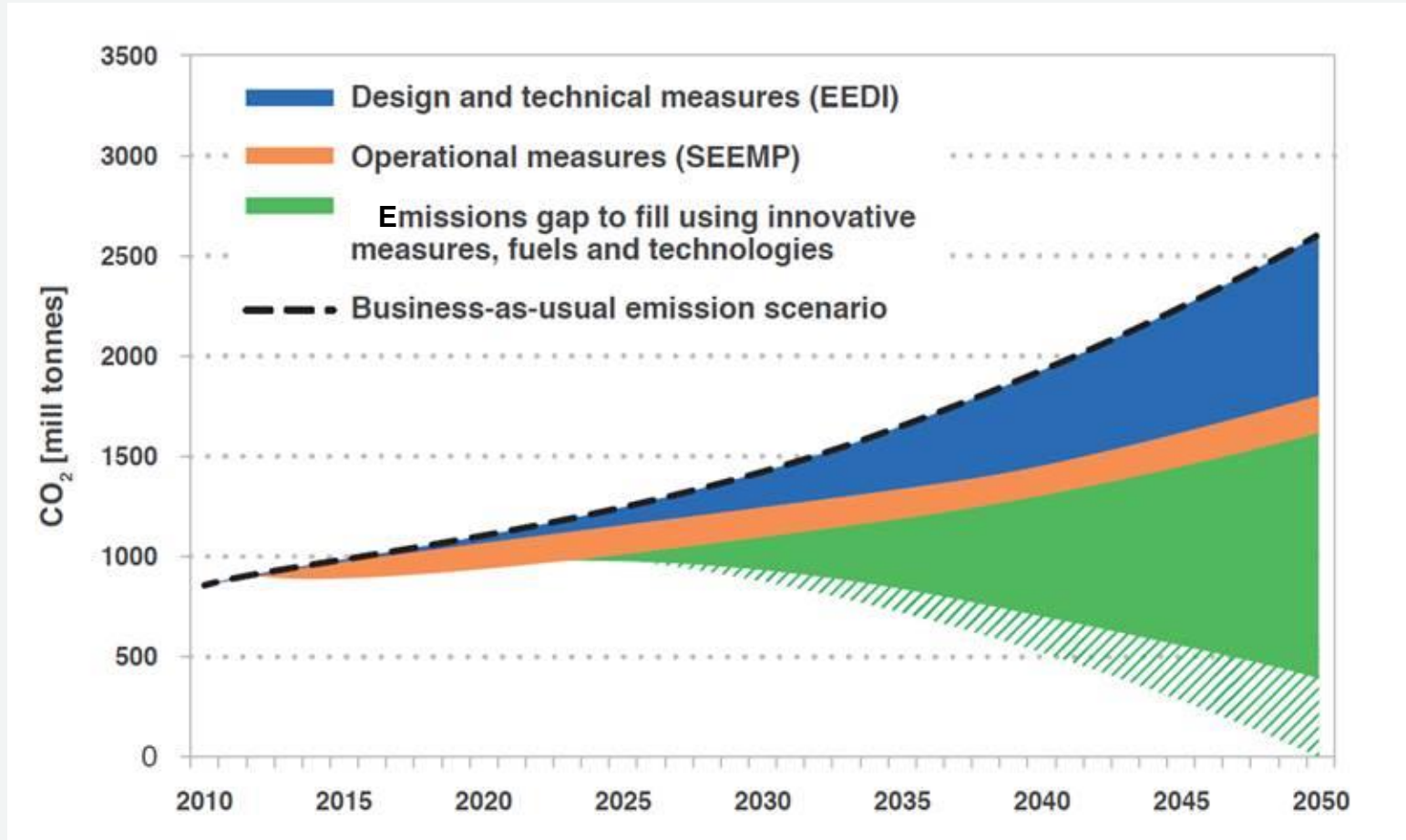


Ports

- MEPC 74 adopted **resolution MEPC.323(74) on *Invitation to Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships***
- This resolution encourages the port sector to engage in the efforts to reduce GHG emissions from ships. It identifies in particular four possible areas of interest:
 - development of Onshore Power Supply facilities (preferably from renewable sources);
 - provision of safe bunkering of alternative low-carbon and zero-carbon fuels;
 - promotion of port incentives schemes; and
 - optimization of port calls, including facilitation of Just-in-Time arrival of ships.



Level of ambition 3: at least 50% reduction of absolute GHG emissions by 2050 (requires approximately 85% CO₂ reduction per ship)



Initial IMO GHG Strategy – levels of ambition

.....the Initial Strategy identifies levels of ambition for the international shipping sector noting that technological innovation and the global introduction of alternative fuels and/or energy sources for international shipping will be integral to achieve the overall ambition.....

.1 *carbon intensity of the ship to decline through implementation of further phases of the energy efficiency design index (EEDI) for new ships*

to review with the aim to strengthen the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type, as appropriate;

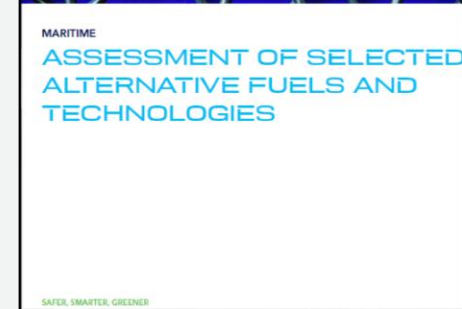
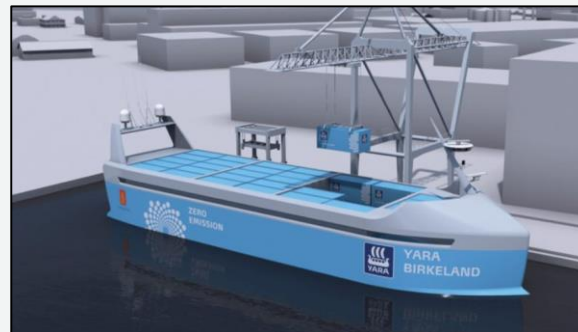
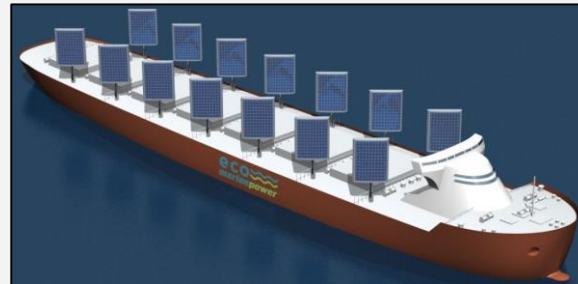
.2 *carbon intensity of international shipping to decline*

to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008; and

.3 *GHG emissions from international shipping to peak and decline*

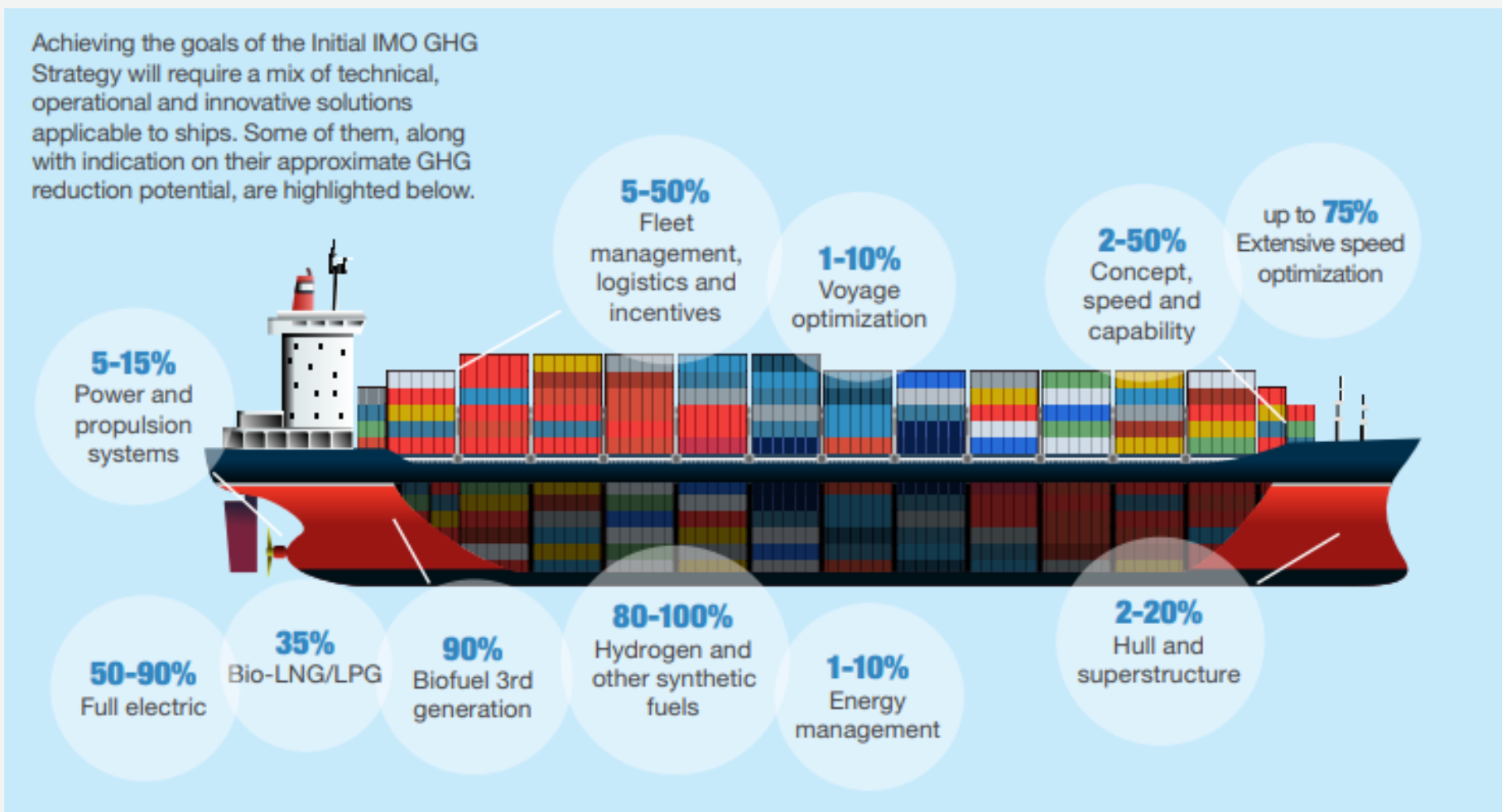
to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008 whilst pursuing efforts towards phasing them out as called for in the Vision as a point on a pathway of CO₂ emissions reduction consistent with the Paris Agreement temperature goals.

The “4th propulsion revolution”?



How to achieve the ambition of the Initial Strategy

Achieving the goals of the Initial IMO GHG Strategy will require a mix of technical, operational and innovative solutions applicable to ships. Some of them, along with indication on their approximate GHG reduction potential, are highlighted below.

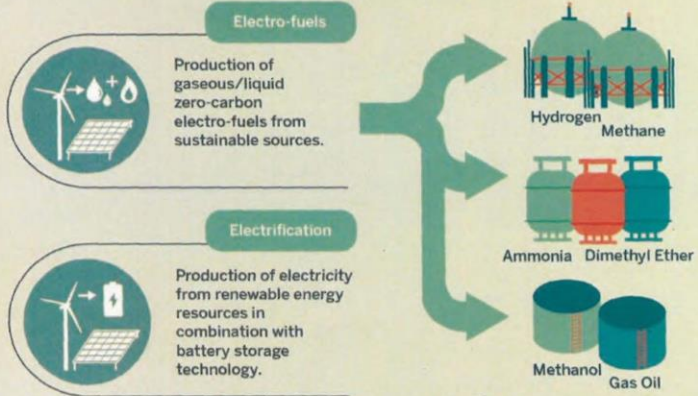


Zero-carbon fuels for shipping

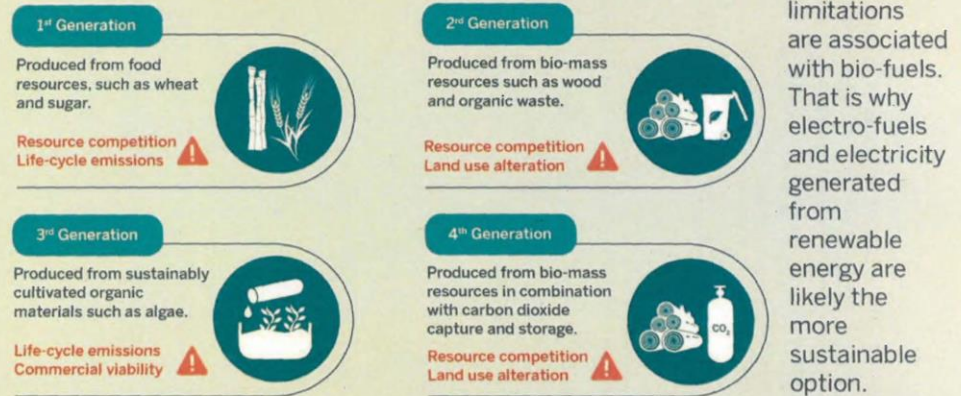
1

Using a mix of electro-fuels and electricity, both made from renewable energy, plus some limited bio-fuels, shipping can achieve the IMO GHG target and reduce its emissions further.

Renewable energy source options + products

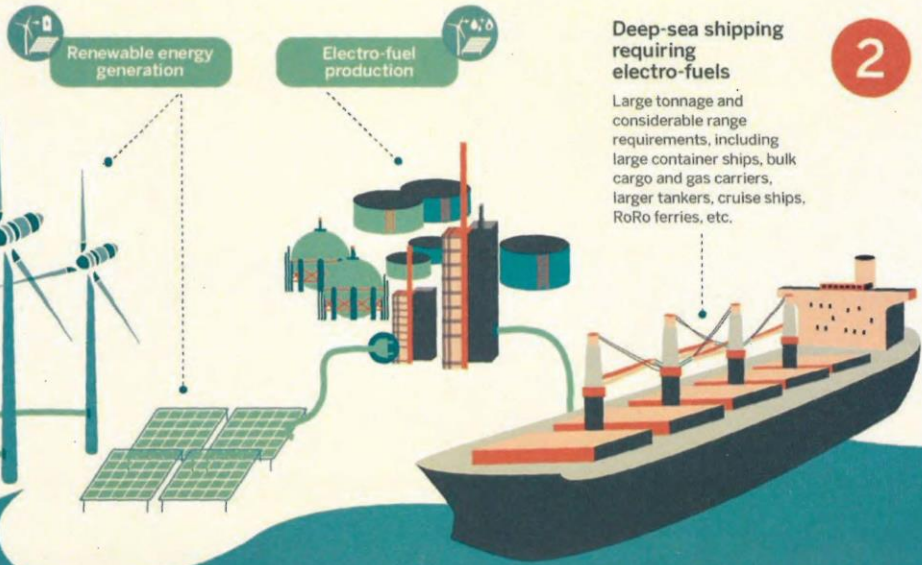


Bio-fuels + limitations



No one solution fits all. Different solutions suit different vessel types based on size, power and range requirements.

Short-sea or domestic shipping suitable for electrification
Relatively small tonnage and limited range requirements, including small cargo ships and tankers, barges, ferries.



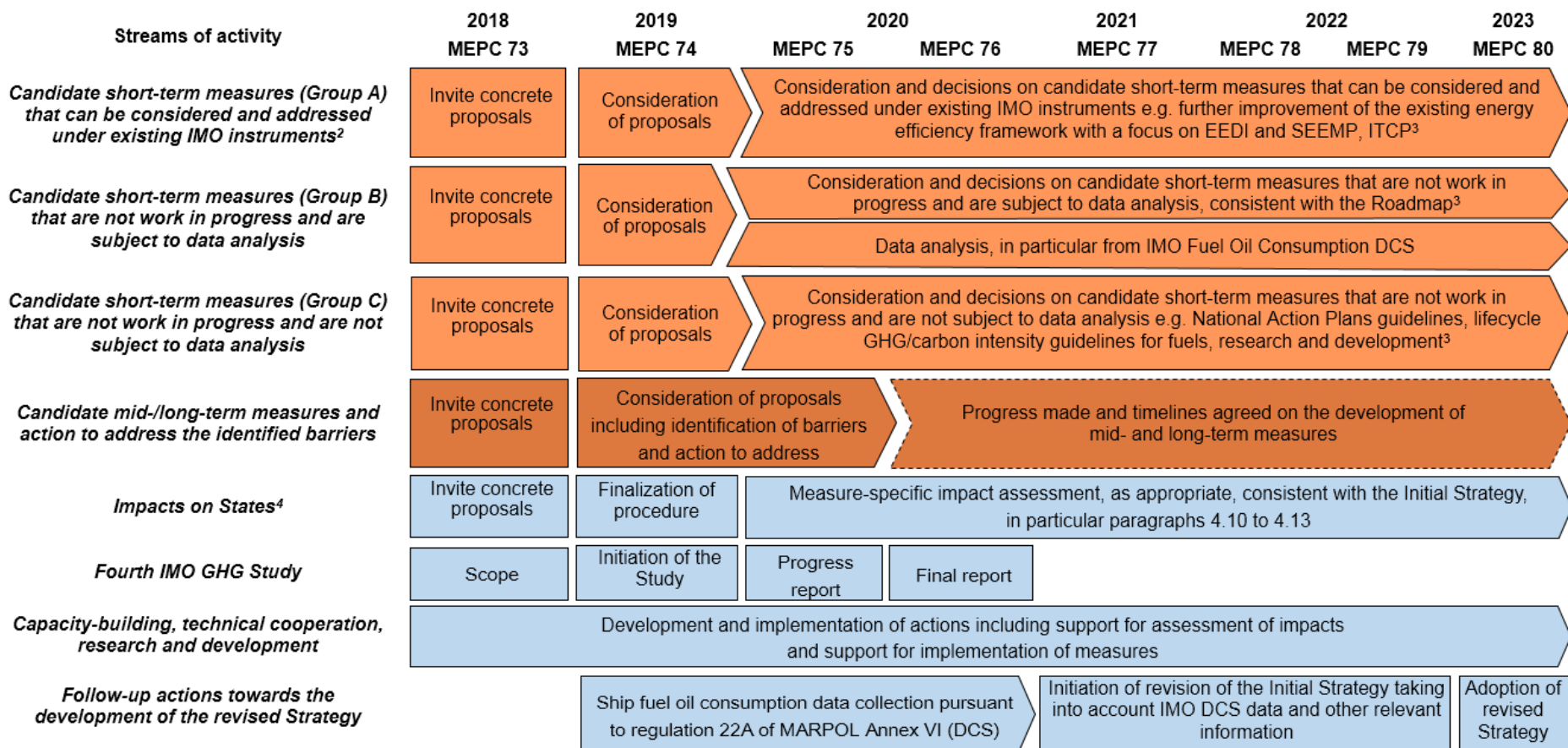
2

Further work is needed to transition the maritime industry to zero-carbon fuels.

3

- Infrastructure**
 - Scale up production of renewable energy production & zero-carbon fuels
 - Improve availability and reduce costs
- Ship level**
 - Scale up deployment of zero-emission vessels
- Regulations**
 - Develop supportive policy, standards and rules

Programme of follow-up actions of the initial IMO strategy to 2023 (approved at MEPC 73)



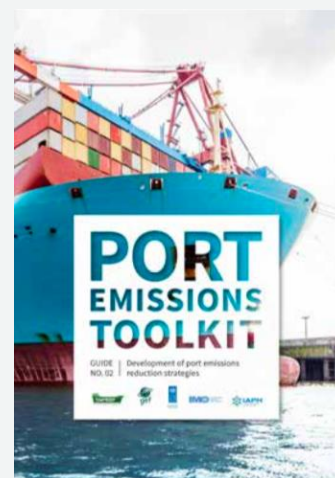
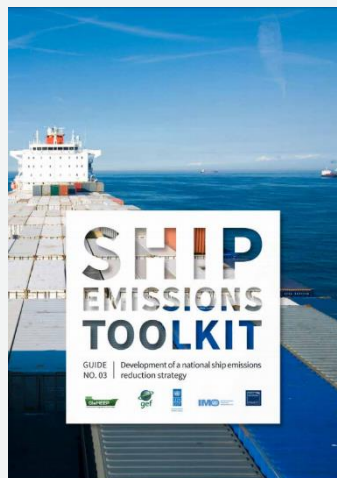
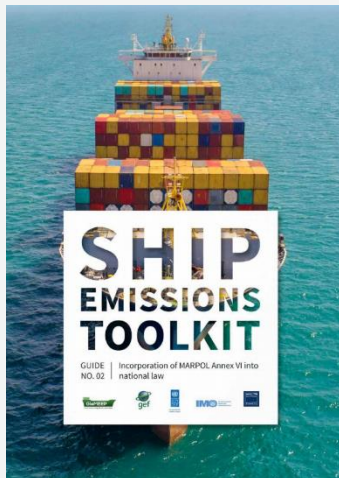
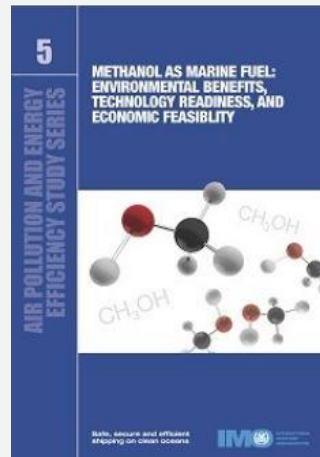
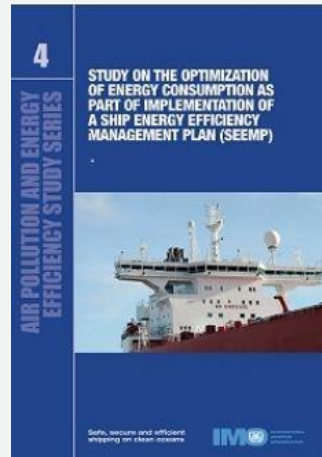
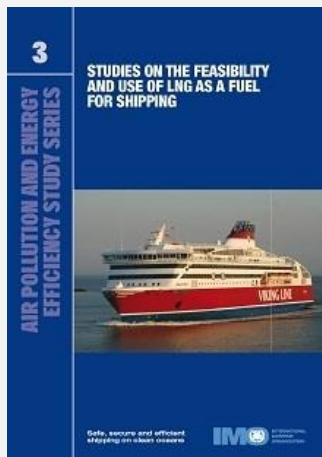
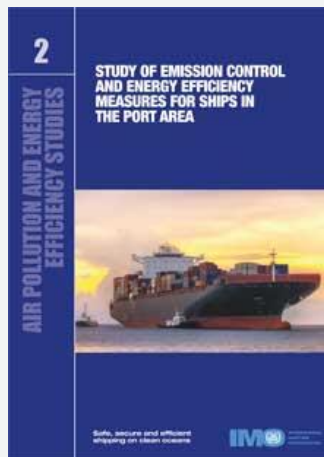
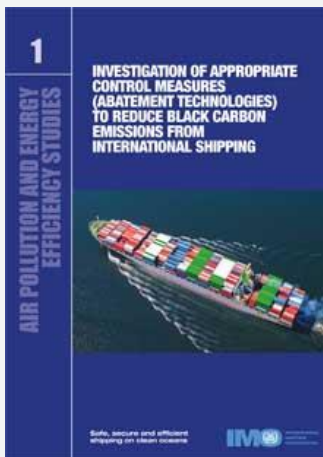
² Includes ongoing work pursuant to regulation 21.6 of MARPOL Annex VI.

³ "In aiming for early action, the timeline for short-term measures should prioritize potential early measures that the Organization could develop, while recognizing those already adopted, including MARPOL Annex VI requirements relevant for climate change, with a view to achieve further reduction of GHG emissions from international shipping before 2023" (paragraph 4.2 of the Initial Strategy).

⁴ Assessment of impacts on States to be undertaken in accordance with the procedure to be developed by the Organization.

Relevant publications

<https://glomeep.imo.org/resources/publications/>



Future of shipping

- enabling environments need to be developed
- current status of maritime technology and future trends include:
 - smarter, data driven, greener ships
 - fully connected wireless onboard & digitally connected via satellite
 - new cleaner fuels
 - new flexible propulsion technologies
 - new materials
- knowledge gap and readiness of maritime companies to effectively deploy new technologies could be addressed through the use of testing/demonstration facilities
- beyond the “hardware” aspect, the role of the seafarer needs greater consideration without which technology cannot be effectively utilised

Thank you for your attention

